

TESTIMONY OF RANDALL W. PORTER

Q. Would you please state your name, address, and occupation?

A. My name is Randall W. Porter. My business address is Suite 300, 200 South Sixth Street, Minneapolis, Minnesota. I am a Project Manager at Dahlen, Berg & Co., and I am Director of Regulatory Affairs at Faribault Energy Park, LLC.

Q. Would you please describe your qualifications?

A. I am a licensed professional engineer in the State of Minnesota. I received a Bachelor of Science degree in Electrical and Electronic Engineering from the University of Minnesota. Prior to my work for Faribault Energy Park, LLC, I served as a manager and senior engineer for Northern States Power Company. I have more than fifteen years of energy-related experience working in the electric utility industry, providing analytical and planning services relating to electric transmission and generation interconnections.

Q. Who is Faribault Energy Park, LLC?

A. The Project will be built and owned and operated by the Faribault Energy Park (FEP), which is wholly owned by the Minnesota Municipal Power Agency (MMPA). In May of 1992, the eight cities of Anoka, Arlington, Brownton, Chaska, Le Sueur, North St. Paul, Olivia, and Winthrop organized the MMPA. In 1995, under Minnesota's power agency law, Chapter 453, the MMPA took on the responsibility of wholesale power supply for its members. Since 1995, MMPA has provided a power supply that has allowed its members to be very competitive in the Minnesota electric energy market. The Faribault Energy Park will be the lead developer of the Project for the MMPA.

Q. Would you please describe the Project?

1 A. The Project is a state-of-the-art, low-cost, dispatchable, natural gas-fired, nominal 250 MW
2 combined cycle intermediate load generation facility. It is expected to have an annual
3 availability factor in excess of 90 percent and can be called upon to deliver up to its seasonal
4 peak capacity within 4 hours from a cold start.

5 **Q. What is the purpose of the Project?**

6 A. The Project is needed by MMPA to meet MMPA load growth by providing intermediate load
7 and peak load capacity for capacity shortages beginning in 2006.

8 **Q. Where will the Project be located?**

9 A. The Project site is located in Rice County. The Project will be located in an area that has
10 been annexed by the City of Faribault for industrial development. The EQB requires an
11 evaluation of two alternative sites for development. Locations of sites are presented in
12 Figure 1 – Vicinity Map of Section 2 of the Site Permit Application. The preferred site is
13 located in the southwest ¼ of the northeast ¼ of Section 13, Township 110N, Range 21W.
14 The alternate site is located adjacent to and east-northeast of the preferred site in the general
15 southeast ¼ of the northeast ¼ of Section 13, Township 110N, Range 21W.

16 **Q. Did FEP consider proximity to fuel and transmission in its selection of a Project site?**

17 A. Yes. The Project is located near the intersection of a major natural gas pipeline and a major
18 electrical transmission line, the Lake Marion – West Faribault 115 kV line. This location
19 was selected so that the Project would provide the most benefits to regional and local area
20 transmission while minimizing the construction of new transmission facilities. Natural gas
21 will be provided to the plant site by a nominal 10-inch line to be built off of the Northern
22 Natural Gas mainline. The location of the natural gas transmission line easement is depicted
23 in Figures 3 and 4 at the end of Section 2 of the Site Permit Application. Both the
24 transmission line and the gas line will be located entirely on the preferred site.

25 **Q. Please give us a detailed description of the plant and associated facilities.**

1 A. The plant utilizes the same technology at both the Preferred and Alternate Plant Sites. FEP
2 expects the following equipment to be required:

- 3 • A Combustion Turbine Generator (CTG) set consisting of a dual fuel dry low NOx
4 combustion technology gas turbine driving a hydrogen-cooled or totally enclosed water-
5 to-air cooled generator. The Turbine will produce a nominal 250 MW.
- 6 • A three-pressure Heat Recovery Steam Generator with a Selective Catalytic Reduction
7 system.
- 8 • A Steam Turbine Generator (STG) consisting of a dual admission, reheat steam turbine
9 and a hydrogen cooled or totally enclosed water-to-air cooled generator.
- 10 • Two condensate pumps and two main circulating cooling water pumps.
- 11 • A 3.41 million gallon per hour (MMGal/hour) Cooling Tower.
- 12 • An Auxiliary Boiler with a burner capacity of 40 million Btu's per hour (MMBtu/hr),
13 natural gas fired.
- 14 • Main 115 kV step up transformers for each CTG and STG.
- 15 • A steam turbine building, which will also house the warehouse and workshop area,
16 control and electrical rooms, a public meeting/observation room, and kitchen facilities.
- 17 • A stack continuous emissions monitoring system (CEMS).
- 18 • An ammonia unloading and storage facility for aqueous ammonia, with pumps and
19 piping for forwarding to the SCR ammonia vaporization skid.
- 20 • A 115 kV substation will connect to the 115 kV Lake Marion - West Faribault line.
- 21 • A 170 foot exhaust stack.
- 22 • A 250,000-gallon demineralized water storage tank.
- 23 • Two 350,000-gallon fuel oil tanks.
- 24 • A water storage tank with a capacity of approximately 1,000,000 gallons.

- A 500 kilowatt (kW) Emergency Generator, fuel oil fired.
- A fire protection system, including a 250 horsepower (hp) Fire Pump Engine.
- A waste water collection system.
- A storm water collection system.

Q. How many workers or employees will be needed for the construction and operation of the plant?

A. Once in operation, the plant would have approximately 17 full-time employees, including residents of the local community. Approximately 250 construction workers will be utilized in the construction of the Project.

Q. What will be the primary fuel used by FEP?

A. It is anticipated that natural gas will be primary fuel used to generate electricity at the power plant. The natural gas would be obtained on a competitive basis from the gas supply market. After metering, the natural gas would flow through a moisture separator and fine filter to remove any particles or dust. The gas would be preheated prior to entering the combustion turbine. Preheating the gas improves the efficiency of the turbine.

Q. Will the plant have a backup fuel source?

A. Yes. Fuel oil may be used as an alternate fuel.

Q. How will fuel oil for the plant be transported and stored?

A. Fuel oil may be transported to the facility via truck, and stored onsite in above ground storage vessels sized to provide a 48-hour supply, in order to comply with MAPP requirements. Preliminary engineering design indicates construction will include two (2) 350,000-gallon capacity fuel oil tanks. All fuel oil storage will be subject to Spill Prevention Control and Countermeasure Plan (SPCC) requirements, which require construction of engineering controls and planning for mitigation of possible releases to the environment.

1 Facilities that have more than one million gallons capacity must obtain an individual
2 permit from the Minnesota Pollution Control Agency (MPCA) according to Minnesota Rules
3 Chapter 7001.4205-4250. In the event the facility exceeds these threshold limits, it will
4 comply with state requirements. Fuel oil operation is not anticipated to be a frequent
5 occurrence, but has been included as an alternative to ensure the maximum flexibility of the
6 Project.

7 Fuel oil storage will occur in one central location to mitigate spill risk as well as
8 provide one central spill containment structure.

9 **Q. How much fuel will the plant use?**

10 A. Fuel use at the facility is a function of temperature and operating characteristics of the unit.
11 It is anticipated at full capacity, the unit would use in the range of two million cubic feet of
12 natural gas per hour when fired on natural gas. When fired on fuel oil, it would use about
13 14,000 gallons of fuel oil per hour.

14 **Q. What is the anticipated usage of the plant?**

15 A. Actual operation would depend on market conditions and the market price for natural gas.
16 Typically the plant will run at a capacity factor of 50 percent, although capacity factors
17 ranging from 40 to 90 percent are possible. The combined-cycle plant offers a large
18 efficiency advantage over a conventional simple-cycle plant. The Faribault Energy Park
19 anticipates the plant will have a 30-year life.

20 **Q. Would you please describe the division of power plant generating facilities into base
21 load plants, intermediate plants, and peaking plants?**

22 A. Power plant generating facilities can be divided into base load plants, intermediate plants,
23 and peaking plants. Base load plants provide a base level of electricity to the system and are
24 typically large. Historically, nuclear or fossil fuels have powered base load plants. Base load
25 plants tend to be operated continuously except when down for scheduled maintenance or an

1 unplanned (forced) outage. They have a relatively high “capacity factor,” typically in the
2 range of 60 percent or greater. The capacity factor is the ratio of the amount of power
3 actually produced in a given period to that which could have been produced if the plant
4 operated at 100 percent power for 100 percent of the time. Lower cost of fuel and higher
5 capacity factor characteristics of base load plants generally result in a low unit cost of power.
6 They are cheaper to run and, as such, are typically run more during any given day than
7 intermediate and peaking plants.

8 Intermediate plants are typically either older, less efficient plants or newer plants
9 constructed specifically for cyclic operation. They are normally operated only during times
10 of elevated load demand and therefore have a lower capacity factor than base load plants,
11 typically in the 25 to 50 percent range. They are less expensive to build than base load
12 plants.

13 Peaking plants are designed to provide the additional power needed during peak
14 system demand periods, such as those caused by high air-conditioning loads during summer
15 months. The capacity factor of peaking plants is fairly low, typically less than 15 percent.
16 These plants are more economical to build than base load or intermediate load plants but are
17 usually more expensive to run and operate.

18 **Q. How much does FEP expect the facility to cost?**

19 A. Detailed engineering and cost estimation has not been completed at this time. Faribault
20 Energy Park expects the capital cost of the facility to be on the order of \$150 million, based
21 upon preliminary engineering estimates and evaluation of market conditions. Final
22 construction costs will not be definitely known until the Project is awarded to a general
23 construction contractor.

24 **Q. Will plant operation affect the attractiveness of adjacent land?**

1 A. Yes. Faribault Energy Park will be constructed so it may sell steam or hot water as a
2 byproduct for possible adjacent industry. This would increase the overall efficiency of the
3 facility, as well as fostering potential economic development of industry requiring significant
4 amounts of steam, such as value-added agricultural processing. Although this would enhance
5 the efficiency of the plant, it would not increase the amount of fuel consumed by the plant.
6 This would make the site much more attractive to possible industrial location, and enhance
7 the market value of adjacent land. The preferred site occupies land closer to the periphery of
8 Interstate 35, removing that land from future development, but allowing the alternative site to
9 be developed for other purposes.

10 **Q. Are these considerations different for the alternate site?**

11 A. Yes. Development of the alternate site would necessitate easements for natural gas and
12 electrical transmission. These easements would make development significantly less
13 attractive, resulting in the possibility of the preferred site being unutilized. If the alternate
14 site were selected, easements for the placement of high-power transmission lines would be
15 required over the preferred site. It is almost certain this area would not be developed. This
16 usage would not be congruent with the City of Faribault's plan for use of this area.

17 **Q. Has FEP considered the possibility of site expansion?**

18 A. Yes. Because of limited natural gas and electrical transmission capacity limitations,
19 expansion of the facility is extremely unlikely. The facility is designed as a nominal 250
20 MW combustion turbine, and ancillary facilities required for operating this facility are sized
21 for this configuration and support requirements. Engineering design of the facility itself is
22 such that it is unlikely expansion could occur without major retrofitting. Expansion of the
23 Project would be cost prohibitive.

1 **Q. How will FEP connect to the transmission grid?**

2 A. The non-profit Midwest ISO (MISO) is an Independent Transmission System Operator that
3 serves the electrical transmission needs of much of the Midwest. The MISO is committed to
4 reliability, the nondiscriminatory operation of the bulk power transmission system, and to
5 working with all stakeholders to create cost-effective and innovative solutions for our
6 changing industry. In coordination with the MISO and Xcel Energy, Faribault Energy Park
7 has studied two options for the Project's interconnection with the transmission grid. We
8 studied a rebuild of the Lake Marion – West Faribault 115 kV line to a higher capacity. This
9 option would entail the reconstruction of approximately 20 miles of line on the existing right-
10 of-way. Alternatively, we studied the addition of a new 161 kV circuit from the plant site to
11 the system. The new 161 kV line could interconnect at either the South Faribault substation
12 or at a new site further south along the South Faribault-West Owatonna 161 kV line. The
13 addition of a new 161 kV circuit from the Project site to the existing system would provide a
14 new transmission source to Owatonna and the surrounding area. There would be a slight
15 increase in 69 kV facility loading near Faribault during certain facility outages, but that could
16 be mitigated by an operating procedure or line re-build.

17 The 161 kV option would require the acquisition of new right-of-way through the
18 Faribault urban area. After studying the two options, FEP has decided to rebuild the
19 existing 115 kV line. The 115 kV line will be sufficient to outlet FEP energy and would
20 not require the acquisition of additional right-of-way.

21 **Q. Has FEP considered how the Project will affect energy supply reliability during**
22 **transmission outages?**

23 A. Yes. Most of the generation for the Twin City metro area (TCMA) is located to the
24 northwest of or within the TCMA. The transmission study conducted by MISO

1 concluded that the proposed transmission upgrades are sufficient to permit successful
2 integration of the new FEP generation resource with the existing power system with no
3 adverse effects on the MAPP bulk transmission system.

4 The Project puts a new significant generation source in close proximity to major
5 loads such as the Twin Cities metro area, Rochester, and the cities of south central
6 Minnesota. This will improve energy supply reliability to these areas during outages of
7 generation or transmission or during disturbance conditions such as those that occurred due
8 to the June 25, 1998, storms. I address this more at page 11 of my testimony. The proposed
9 site is well located both electrically and geographically.

10 **Q. Do construction needs for the electrical interconnect differ at the preferred and**
11 **alternate Project sites?**

12 A. Yes. The preferred site would require less distance of construction for the electrical
13 interconnect than the alternate site. Based upon preliminary engineering cost estimates, it
14 appears this cost differential could be as much as \$125,000 dollars. In addition, construction
15 of a transmission interconnection from the alternate site would idle a considerable amount of
16 land from potential development, and require the purchase of a transmission easement.

17 **Q. How does FEP propose to acquire natural gas service?**

18 A. Natural gas will be provided to the Project site by a new 10-inch line off the Northern Natural
19 Gas (NNG) mainline. The NNG mainline consists of five pipes ranging from 16 to 30 inches
20 in diameter in southern Minnesota. The new 10-inch line (anticipated to operate in the range
21 of 400 psi) to the Project site will consist of less than one mile of line and will be routed to
22 the plant site on FEP land, or if the alternate site is selected by private easement. Because the
23 gas distribution system is designed around a wintertime peak, there is sufficient excess

1 natural gas available to serve the maximum needs of the plant (summertime, hot weather
2 operation). The Project will have an interruptible natural gas supply.

3 The proposed route of the pipeline for the preferred site is shown in Figure 3 of
4 Section 2 of the Site Permit Application, and the proposed route of the pipeline for the
5 alternate site is shown in Figure 4 of Section 2 of the Site Permit Application.

6 **Q. Does the plant have a backup fuel source it can use if natural gas service is curtailed or**
7 **interrupted?**

8 A. Yes. Fuel oil is included as a backup fuel as required for MAPP accreditation. In addition,
9 fuel oil may be used in limited circumstances when economics favor its use.

10 **Q. Do construction needs for the natural gas pipeline differ at the preferred and alternate**
11 **Project sites?**

12 A. Yes. The preferred site would require significantly less construction of natural gas pipeline
13 to access natural gas supply, resulting in about a \$1.1 million dollar reduction in pipeline
14 costs. In addition, construction on the alternate site would require the acquisition of a
15 pipeline easement.

16 **Q. Has a Certificate of Need been approved for this Project?**

17 A. Yes. The PUC voted to approve the Certificate of Need on July 10, 2003.

18 **Q. Did FEP consider using or paralleling existing rights of way, survey lines, natural**
19 **division lines, and agricultural field lines in locating the generator and ancillary**
20 **equipment and in routing the gas and transmission lines?**

21 A. Yes. There were no existing rights of way, natural division lines or field lines in the area that
22 could have been used or paralleled for either the primary or alternate sites. The gas and
23 transmission line routing is entirely contained within the preferred site. If the adjacent
24 alternate site is selected, the gas and transmission line routing was selected to minimize
25 adverse environmental effects.

1 **Q. Did FEP consider the use of existing large electric power generating plant sites?**

2 A. Yes. Neither FEP nor MMPA owns an existing large electric power generating plant. Of
3 primary importance in site selection was proximity to a high voltage electric transmission
4 line, a high-pressure natural gas pipeline and proximity to MMPA loads. The primary site
5 has both a high voltage transmission line and a high-pressure gas line located on the site and
6 is well located for serving MMPA loads. Proximity to the electric and gas lines minimizes
7 the environmental impacts associated with providing gas and electric services to the site.
8 There simply were no existing generating sites available to the MMPA that met these criteria.

9 **Q. Did FEP consider using existing transportation, pipeline, and electrical transmission**
10 **systems or rights-of-way?**

11 A. As noted above, the site was selected in large part because an existing high voltage
12 transmission line and a high-pressure gas pipeline were already located on the site. In
13 addition, a railroad runs along the east side of the alternate site, less than 2000 feet from the
14 primary site. Interstate 35 runs along the west edge of the primary site. It will be necessary
15 for Faribault to complete the extension of an existing street to complete roadway access to
16 the sites.

17 **Q. Did FEP consider electric system reliability in the planning of the Project?**

18 A. Yes. FEP has applied to the Midwest Independent System Operator (MISO) for an
19 interconnection to the MISO transmission system. MISO is the operator of the transmission
20 system in the Midwest area, and has the responsibility for ensuring that the Project does not
21 degrade system reliability. Interconnection studies have been conducted by MISO as a part
22 of the interconnection process. These studies show that the Project will enhance transmission
23 system reliability in the Faribault area when interconnected.

24 The Project is located near a major electrical transmission line, the Lake Marion –
25 West Faribault 115 kV line. This location was selected so that the Project will provide the

1 most benefits to regional and local area transmission while minimizing the construction of
2 new transmission facilities. When the Project is completed, the overall performance of the
3 entire integrated regional transmission system will meet or exceed all applicable reliability
4 criteria. The Project will improve some of the transmission constraints, or bottlenecks, which
5 currently impede regional and inter-regional transactions. For instance, the Project
6 counteracts the prevailing flow and reduces loading on defined constrained interfaces in
7 southern Minnesota, central Wisconsin and North Dakota, and does not increase the flow on
8 any other constrained interface by more than the acceptable standard. The Project improves
9 the reliability of the regional transmission system by reducing possible overloads of nearby
10 regional transmission facilities that can presently occur during high stress conditions and
11 facility outages.

12 **Q. Was an evaluation done to determine whether there are potential beneficial uses of**
13 **waste energy from the proposed generating plant?**

14 **A.** Yes. First, the use of a waste heat recovery boiler in the combined cycle process boosts the
15 efficiency of the Project from about 30 to 35 percent to an expected 56 percent. This boost in
16 efficiency is made possible by the use of the waste heat from the turbine to make steam to
17 operate a steam turbine to produce an additional 100 MW of electricity. In addition, FEP will
18 be pursuing the possible sale of hot water from the combined cycle process for use in a
19 production process in the adjoining industrial park.

20 **Q. Was the future need for additional high voltage transmission lines in the Project area**
21 **evaluated?**

22 **A.** Yes. In order to outlet the entire output of the plant in combined cycle, it will be necessary
23 for FEP in cooperation with MISO and Xcel to upgrade the existing 115 kV transmission line
24 between Lake Marion and West Faribault. There would be no future benefit to increasing the
25 capacity of the short outlet line that is being constructed on FEP property.

1 **Q. In your opinion, would it be advisable to oversize the 115 kV transmission facilities**
2 **running by the site through multiple circuiting or design modifications in order to**
3 **facilitate future transmission capacity expansion?**

4 **A.** No. Responsibility for planning the transmission needs for our area rests with the Midwest
5 ISO. As mentioned above, MISO has studied and determined the facilities required for the
6 FEP interconnection and the outlet of energy from FEP into the transmission grid. Presently,
7 there are no identified future transmission projects that would benefit from the oversizing of
8 the 115 kV facilities associated with FEP

DIRECT TESTIMONY OF

RANDALL W. PORTER

**IN THE MATTER OF THE APPLICATION
OF FARIBAULT ENERGY PARK, LLC,
FOR A SITE PERMIT FOR A NOMINAL 250 MEGAWATT
COMBINED CYCLE COMBUSTION TURBINE IN RICE COUNTY**

(DOCKET NUMBER OAH 15-2901-15778-2)

BEFORE THE

MINNESOTA ENVIRONMENTAL QUALITY BOARD

ON BEHALF OF

FARIBAULT ENERGY PARK, LLC

MARCH 29, 2004
